

MSPI WORKSHOP

July 23-25, 2002

QUESTIONS AND PRELIMINARY ANSWERS RESULTING FROM THE BREAKOUT SESSIONS

Hope Creek/Salem:

Should we use risk significant functions from NUMARC 93-01 or PRA modeled functions if they are different?

Answer: Use your PRA modeled risk significant functions.

Water sources

Should water sources be included for unavailability, but not unreliability?

Answer: for unavailability only

In what cases should the connection to the alternate water source be included in the system boundary?

Answer: if risk significant and modeled in the PRA

What components from the alternate water source should be included?

Answer: Only the connecting active valve. Manual valves are excluded from the scope of the MSPI

Can air compressors of the diesel starting system be excluded from the EDG boundary (Figure F-1 of 99-02 shows in totally within boundary)?

Answer: Yes, only starting air system receivers are included in the boundary

Should diesel cooling valves (shown in figure F-1) which actuate within component cooling be included in the boundary?

Answer: No, it is part the cooling system (Figure F-1 has been revised)

Should LPCI mode of RHR be included in MSPI? (Hope Creek has 8 low pressure pumps.)

If LPCI is needed, is it possible to monitor A and B trains only? A & B will be monitored for suppression pool cooling but not trains C and D (LPCI functions only)

Answer: Yes, if it is modeled in level 1 at power PRA and identified as risk significant.

Is recirculation pump discharge valve needed within RHR post accident decay heat removal boundary (as it prevents Rx bypass)(not currently modeled in the PRA)

Answer: Hope Creek needs to provide the response

Support system active components

Are service water pump strainers in support cooling systems active components based on high debris loads and inability to survive for mission time?

Answer: they are not active components, but their clogging should be included in UA

Are service water traveling screens in support cooling systems active components?

Answer: No, they are not active components, but their clogging should be included in UA

How to get baseline data for these components given widely varying plant conditions?

Answer: UA data needed only for the baseline

Train determination in service water system: plant has multiple pumps with crossties to two headers (high redundancy). Headers are not modeled in PRA. (Salem)

Answer: Already covered

How should components common to multiple trains or systems be addressed for unavailability? For example, the suppression pool is included and common to RHR (multiple trains), HPCI, and RCIC. If the suppression pool is unavailable, is this time captured within all applicable trains and systems or just one or some? If not all, what is the basis for assigning?

Answer: Already covered

BRAIDWOOD

AFW boundary

Should water source (eg. CST, RWST) be included as an active component?

Answer: No, water sources such as tanks are passive components.

Should the service water system valve needed to support AFW function be included in the AFW system boundary?

Answer: only if risk significant function

When an MOV that is required to be manually (via control switch), has electrical interlocks from other valves to allow closure, are those associated interlock valves considered "active?"

Answer: Valves are not considered active. Interlock features within the monitored system's valves are included

Need to clarify train .vs. system redundancy. See figure

Answer: Included in the guidance

How to prevent double counting of RWST or sump because they could be counted in charging SI or RHR?

Answer: For UA they are double counted in all affected systems.

Observation: Success criteria dependent upon the choice of initiating event. For example, ATWS, there are certain (timing) requirement .vs. other events.

LIMERICK

What should be the boundary between the active components that require DC power for control and operation?

Answer: Voltage supply breaker (both motive and control power)

For systems that have a diverse water source and suction path, such that both suction sources are required to meet the risk significant function, should all the active valves in the diverse path be monitored as active components?

Answer: Yes

CST can not supply RCIC for its required mission time without operator action that is modeled in PRA (there is a normally open valve between CST tank and pump). Suppression pool can supply RCIC for its mission time (there is valve between SP and pump). Are these valves redundant?

Answer: No, valves are not redundant. Both should be included

What is the acceptable method for determining mission time?

Answer: PRA mission times, that need to be reasonably justified

Since HPCI and RCIC are required at 200# and 150#, should the time between when the reactor is critical and these reactor pressures be counted as unavailability?

Answer: No

What modes of the RHR system are within the scope of the MSPI?

Are all PRA modeled risk significant functions (SPC, LPCI, SDC)?

Answer: Yes

For shared systems between units (RHRSW) with four pumps serving two loops, how is unavailability counted:

1. For IEs that impact only one unit, the remaining pump on the affected loop is sufficient to fulfill the safety functions for both units; therefore, do not count unavailability.
2. For LOOP which affects both units simultaneously, the remaining pump on the affected loop is NOT sufficient to fulfill the safety function on both units. It is available for one unit, not both. Therefore, unavailability should be accrued on the unit to which the remaining pump is not normally aligned

Answer: Limerick to check on these issues

Both units EDGs are modeled in both unit's PRA (but differently; unit 1 PRA models 8 EDGs and unit 2 PRA models 6 EDGs). Each EDG has two FV values, one for each unit. Should failure on unit 2 EDG be counted on unit 1 MSPI? Should we treat EDG as a 8 train system and use the unit specific FV values depending on what unit is effected?

Answer: Discussed with Limerick

Surry

Should redundant valves within a system (not train) be considered in scope?

Answer: Yes, if failure of both valves in a system prevents system to prevent its risk significant function.

Should AFW unit crosstie MOVs be included in scope?

Answer: Yes

Should interlock on EDG output breaker (fails breaker to close) be included in scope?

Answer: Yes

Should Containment Spray system be included in LPSI or RHR?

Answer: Yes, if it was identified in the PRA as a risk significant post accident decay heat removal function. This excludes containment spray system used only for containment pressure control.

Should failures of dedicated EDG DC battery be included in EDG boundary?

Answer: Yes, if it is dedicated to a specific EDG and not part of station normal DC distribution system

SONGS / Palo Verde

Should containment Spray system be included in LPSI or RHR?

Answer: Yes, if it was identified in the PRA as a risk significant post accident decay heat removal function. This excludes containment spray system used only for containment pressure control.

RWST suction valves closure (valves normally open) is needed for adequate NPSH. Should failure of those valves be included in scope?

Answer: Yes, they should be included for UA scope of RHR system PI of the MSPI but not for UR as a monitored component. This is a plant specific issue

Should containment sump suction valves be included as monitored components in all affected systems?

Answer: Yes, but if more than one system crosses the threshold because of single valve failure, issue will be considered as one "WHITE" issue

Should actuation logic circuits (i.e, pump start relays) be included within the scope of monitored components?

Answer: Yes, it is dedicated part of the system. ESFAS signals are not.

GUIDANCE ISSUES

Clarify how RHR function is implemented:

Current FAQ in 99-02 includes shutdown functions which would not be included in current MSPI

Answer: Low pressure injection function should be included if it is risk significant

Concern that containment sump failure would double count in HPSI and CSS

Answer: For UA sump failure will be double counted in all affected systems.

Need to clarify issue of installed spare pumps. Suggest the following:
UR includes demands from all three pumps

Answer: Yes

UA calculated on train basis, crediting the spare when it is used

Answer: Yes

FV ratio would be based on one train

Answer: Yes

Need to clarify that UA boundaries include all components needed for function (eg. Water in tank, initiating circuits, non active components)

Answer: Yes

Possible change in philosophy for the support cooling threshold. Adding data from two systems may either mask problems or trip threshold too soon.

Answer: This issue will be studied during the course of the pilot

How do we get baseline data for support cooling water system? How do we take into account environmental circumstances that may have effect on the baseline values?

Answer: Already discussed

How do we communicate MSPI results to the public (momentary situation at the plant)?

Answer: Will be discussed later

PRAIRIE ISLAND

Should RHR long term cooling function following a SG tube rupture be included in scope of risk significant functions?

Answer: Yes, if it is a risk significant function and modeled in level 1 at power PRA

Should AFW trip throttle valves be included in the AFW pump boundary?

Answer: No

Should valves in the CCW system that isolate nonessential loads or isolate trains be included within the system boundary?

Answer: Yes, if failure of these valves to close would fail the risk significant function

Should manual valves that require operator actions to satisfy risk significant functions be included within the scope of the system boundary as monitored active components?

Answer: No, manual valves do not count as monitored active components

Should cross-tie valves (either manually or remotely operated) between units that are required to change state to fulfill a risk significant function be included as monitored active components?

Answer: Remote operated valves should be included as monitored active components. Manual valves are excluded from the scope of the UR

Safety injection system requires more demand failures than expected demands to trip the threshold. EDG require five demand failures on six

demands to trip the threshold. Do we have validity test for false-negative indications?

Answer: NRC to check

Plant's F-V values for CCW and ESW do not account for contribution to both mitigation and initiating event but only mitigation. This will underestimate the risk considerably.

Answer: answer needs to be developed

SOUTH TEXAS

Should a safety system that is only required for hot leg injection, whereby its failure has little impact on CDF be included in the scope of monitored components?

Answer: Yes, if it is a risk significant function and modeled in level 1 at power PRA

Should EDG output breaker be included in EDG boundary?

Answer: Yes, it already is

Should ASME requirements for valve stroke time be used as success criteria for valve mission time?

Answer: No, if the success criteria for the train mission time can not be met during valve stroke time

How tank level requirements should be treated in success criteria?

Answer: included in the guidance

How to get baseline data for support systems running and stand-by components?

Answer: already discussed

Millstone 2/3

Should unavailability be counted during a surveillance period where the non-active component results in the system or train not performing its safety function?

Answer: Yes, UA should be included if the train can not perform its risk significant function during the maintenance

Should fire protection system pumps and valves needed to provide alternate water supply for AFW be included within the scope of the AFW monitored components?

Answer: No, they are part of the fire protection system. Only the active connecting valve between alternate and actual path should be included

Should the alternate path be included in the system boundary if the primary source is enough?

Answer: No, if the primary source is enough (alternate answer: Yes, if the alternate path is modeled in PRA and determined to be risk significant)

Is the data provided in Table 1 of Appendix F applicable to be used for CE RHR pumps (containment spray pumps)?

Answer: This will be checked by NEI prior start of the pilot

Should strainer clogging due to debris caused by external events (i.e., seasonal storms) be included in the unavailability or unreliability portion of the MSPI?

Answer: PRA defined external events are excluded. Environmental conditions that routinely impact monitored systems performance at power are included

General Questions

Is it intended that RHR functions be heat removal and low pressure injection?

Answer: See earlier answers and revised guidance

How can risk significant operator actions to meet mission times be credited in success criteria?

Answer: They can be credited only if they are modeled in the PRA

Should success criteria be at the component level or at the train level? Is it different for UA and UR?

Answer: Success criteria at the train level to meet its risk significant function. Individual component's capability must be evaluated against train level success criteria. No difference between UA and UR.

If the EDG day tank is not sufficient to meet its mission time, should the fuel transfer pumps be monitored as active components?

Answer: Fuel transfer pumps are not included, they are considered as support system. (Tentative answer)

The term "active component" needs to be clearly defined in the guidance. The understanding is that the intent of the definition of active component means that for valves, they are not only captured if they change state, but also if the valve is automatic, manual, or remote.

Answer: will be included in the guidance

What functions are meant by RHR shutdown cooling? What is the basis to include shutdown cooling (a non-power mode) – reactor condition end point (cold shutdown), mission time (first 24 hours after an event) or some other basis?

Answer: Needs to be defined. Usually 24 hours or less after event if justified

Should the risk significant functions included in the scope of the MSPI be mentioned in the guidance document in the system description section?

Answer: unknown as of this time

Should support cooling water system risk significant functions only include those functions that support the cooling of front line monitored systems? Support systems may have other risk significant functions.

Answer: Only those required for front line systems should be included. Will be clarified in the guidance

Questions from the general session (Tuesday, August 23)

If you have an indicator that is not valid and you have a random failure where there is not a "licensee performance issue", then IMC 0612 would not send this through the SDP. How would it be addressed in the inspection report?

Answer: Staff needs to address response

For identical units – in calculating baseline UR_{bc} – do you use all demands and failures for the site or for each unit separately?

Answer: Pooling the data system by system basis

MSPI approach uses indexes that do not represent actual change in CDF. It overestimates ΔCDF by adding redundant trains PI linearly. Since MSPI does not represent actual ΔCDF , current criteria based on ΔCDF can not be applied to MSPI. New color criteria is needed for MSPI. What is the plan for developing new criteria?

Answer: Answer not yet available

The contribution to MSPI from URI will always be negative if there are no actual failures. Therefore there will be a compensation for increased UAI. Negative ΔURI does not mean improving performance and should not be used to compensate for a positive ΔUAI . Comment on Max rule

for FV/UR ratio. For different modes (e.g., fail to run vs fail to start) why not treat them like different components.

Answer: Answer not available yet

The success of the MSPI program depends on having "adequate" plant specific PRAs for the fleet of plants. What does the panel understand by "adequate" in this context, and how do they propose to use PRA standards to demonstrate this adequacy? Will NEI guidance include a discussion of adequate PA quality?

Answer: This will need to be addressed for the ACRS

Unavailability baseline – For SSC that interact directly with environment – environmental conditions (sea grass), organisms (veliger), and special environmental restrictions are not predictable or consistent (even over a 3 year period). How do we handle these cases?

Answer: previously answered

Data from 1999-2001 are used for UA based on being more accurate. Why isn't 1999-2001 data used for UR instead of 1995-1997? The Maintenance Rule began in July 1996 and could have affected its accuracy.

Answer: Basis for the selection is in the guidance manual. Data will be studied through table top exercises.

Why is there no initializing or adjusting factor in the MSPI calculation? Many simplifications and data exclusions exist and these all reduce the MSPI result. Some adjustment may be needed.

Answer: Answer will be provided through the course of the pilot

Consider the case where a MSPI is considered invalid (grey). According to the presentation; no data on the system would be reported. In the original formulation of the ROP, we had PIs and inspection program that complemented these PIs. If we have an invalid PI, how are we going to

revise the inspection program to account for the lack of the PI? What additional areas will be inspected and how much effort will be expended in these areas?

Answer: Can not be answered at this stage.

Have we established a methodology for determining mission time? What is it? How will we treat the case of a licensee asserting that EDG mission time should be 6 hours and not 24 hours as typically assumed?

Answer: Reference to ASME PRA standard

It is not obvious that the MSPI is sufficiently rigorous and complete to justify negative values for UAI and URI. What is the technical basis for justifying the allowance negative values for these parameters?
Recommendation: UAI and URI be capped on the lower end at 0 or UAI and URI should always be ≥ 0 .

Answer: Will be studied through table tops

What constitutes a normal surveillance test? This should be predetermined and articulated in the guidance.

Answer: quarterly or more frequent test

How are we going to combine the MSPI value with a risk characterization from shutdown and external initiators? Consider an EDG issue that overlaps at power operation and shutdown. MSPI covers the risk characterization while at power. How is the risk characterization for shutdown risk, and the risk due the external initiators (both at power and shutdown) combined with the MSPI value to give a risk characterization?

Answer: Outside the scope of MSPI. Will be included in the inspection process

Draft NEI 99-02 states that a performance of SSCs specifically excluded from the PIs is the effect of common cause failure and the performance of certain plant systems. These aspects of licensee

performance will be addressed through the NRC inspection program. Will this be revised to clarify that concurrent findings; demand failures not capable of being discovered during normal surveillance tests; failures that affect shutdown risk; and failures that have a risk contribution due to external initiators also be included in this exclusion?

Answer: Yes, are already in the manual

Depending on how importance measures are determined, they may not include the contribution to risk of a basic event due to effect on initiating event frequency (e.g., CCW pump has a mitigating aspect as well as an initiating event impact by making the LCCW initiator more likely when a condition exists with that pump). How are the FV importance measures to be calculated / determined to ensure that all of the risk contribution is captured.

Answer: Outside the scope of MSPI. Will included in the inspection process